**WEATHER, SECTION II STUDY GUIDE**

**Lessons 6, 8-12**

**Main Ideas**

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| **Essential Questions** | **Guiding Questions** |
| 1. How are proportional relationships used in science? | a. What does it mean for variables to be inversely proportional?  b. What does it mean for variables to be directly proportional? |
| 1. What are the properties of gases? | a. How can you predict the volume of a gas sample?  b. What evidence do we have that gases exert pressure?  c. How does a gas volume affect gas pressure?  d. How does gas pressure change in flexible and rigid containers?  e. How does a gas temperature affect gas pressure?  f. How does a gas temperature affect gas volume?  g. What are the relationships among pressure, volume, and temperature for a sample of gas?  h. How can we describe the movement of gas particles? |

**Students will know:**

1. Density of ice, snow, and water vapor differ from that of liquid water.
2. Relationship between mass, volume, and density of solids, liquids and gases numerically and graphically
3. The kinetic molecular theory (model) of gases describes the motions of all gases
4. If pressure and amount of gases are fixed, volume and temperature of gases are proportional to each other
5. Gases can form by solid sublimation or liquid evaporation
6. When gases form from liquids or solids, molecules spread far apart, greatly increasing volume and decreasing density (both by about 1000 times)
7. Gases expand to fill whatever container they are in.
8. The atmosphere is a mixture of gases including gaseous water
9. Molecules in the atmosphere colliding with anything they contact at sea level exert pressure equivalent to 14.7 lbs in each square inch.
10. Squeezing a gas into a smaller volume, exerts more pressure on container as more collision occur in the smaller space. Conversely spreading a gas out over a larger volume, leads to less collisions and so less sensed pressure.
11. Explain relative effects of temperature on pressure in flexible and rigid containers

**Students will be able to:**

1. Use a graph of mass vs. volume to determine density (IAE)
2. Convert between Celsius and Kelvin temperature scales (Calculate)
3. Use proportions to calculate changes in volume with temperature and vice versa. (Calculate)
4. Draw molecular views of water vapor, liquid water, and ice (DCI)
5. Calculate the effect of pressure on volume and vice versa using Boyle's law (Calculate)
6. Calculate the expected pressure as temperature is varied for flexible and rigid containers (Calculate)

**Vocabulary**

1. physical change
2. phase change
3. proportional
4. absolute zero
5. Kelvin scale
6. kinetic theory of gases
7. temperature
8. Charles' Law
9. evaporation
10. pressure
11. atmospheric pressure
12. atmosphere (atm)
13. inversely proportional
14. Boyle's Law
15. Guy-Lussac's Law
16. sublimation